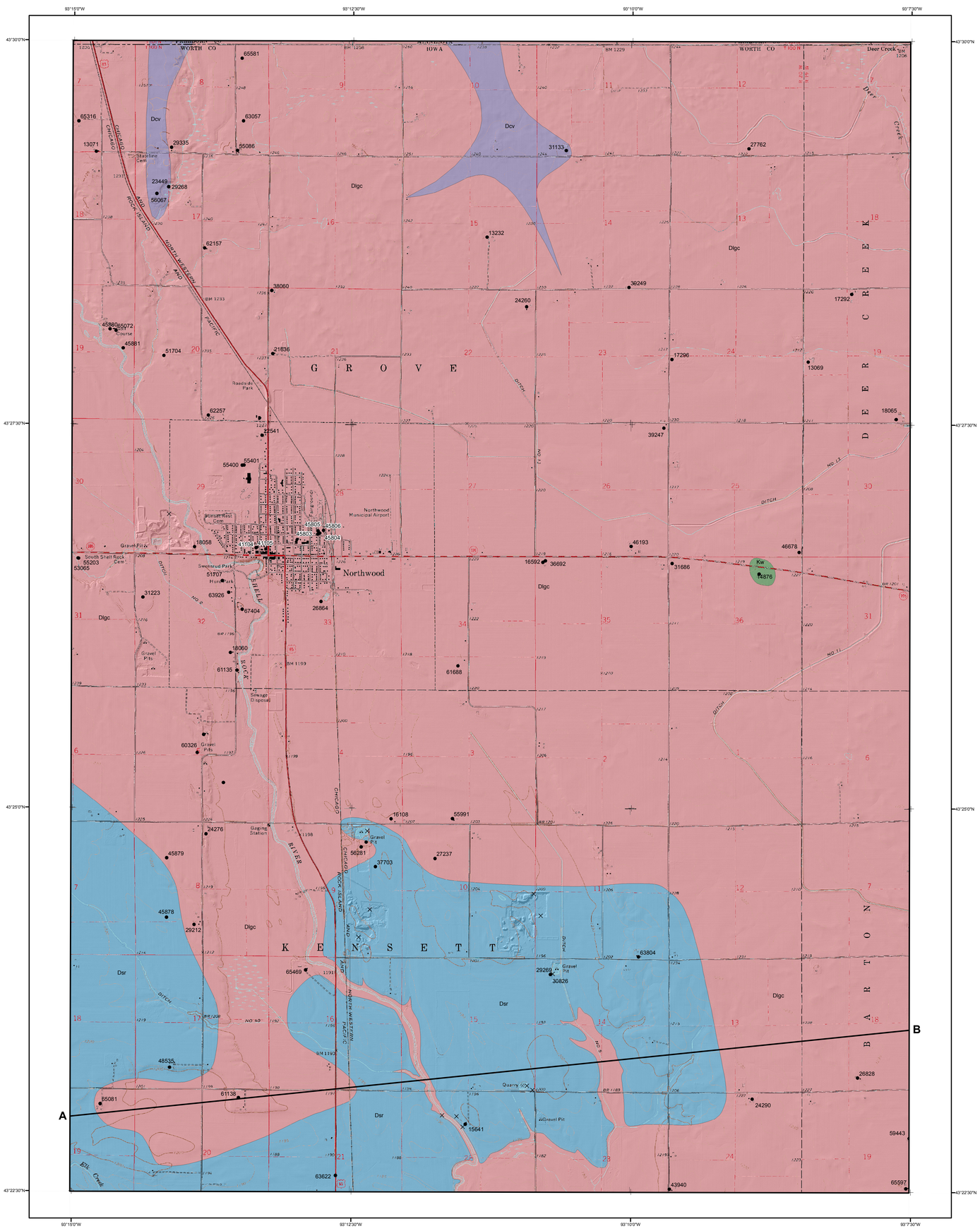
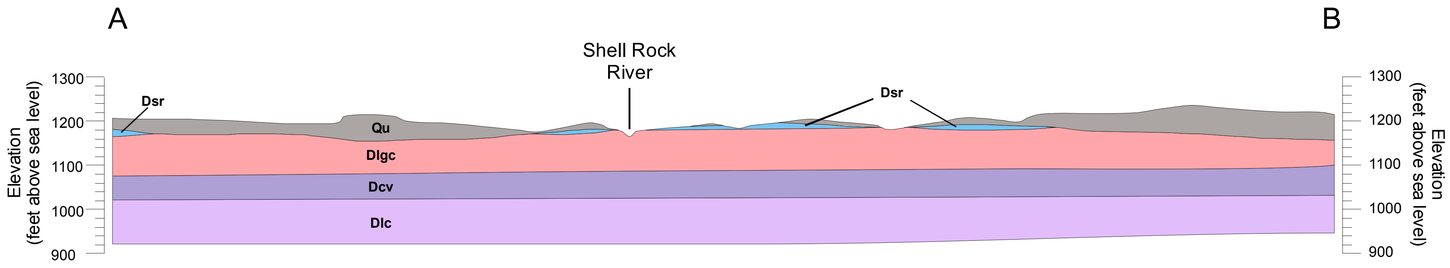
Bedrock Geology of the Northwood (Iowa) 7.5' Quadrangle



Adjacent 7.5' Quadrangles

Location Map

GEOLOGIC CROSS-SECTION A-B



Base map from USGS Northwood 7.5' Digital Raster Graphic (IGS GIS file DRGB29.TIF) which was scanned from the Northwood 7.5' Topographic Quadrangle map, published by US Geological Survey in 1972
Topographic contours and land features based on 1971 aerial photography, field checked in 1972
Land elevation contours (10' interval).

Iowa Geological and Water Survey digital cartographic file Northwood_BedrockGeology2011.mxd, version 9/28/11 (ArcGIS 10.0)
Map projection and coordinate system based on Universal Transverse Mercator (UTM) Zone 15, datum NAD83.

The map and cross section are based on interpretations of the best available information at the time of mapping. Map interpretations are not a substitute for detailed site specific studies.

BEDROCK GEOLOGY OF THE NORTHWOOD 7.5' QUADRANGLE, WORTH COUNTY, IOWA

Iowa Geological and Water Survey
Open File Map OFM-11-02
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prepared by

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Introduction to the Bedrock Geology of the Northwood 7.5' Quadrangle

The Northwood 7.5' Quadrangle mostly within Worth County, Iowa, is located near the border area of the Des Moines Lobe landform region, which was the last area covered by Quaternary glacial drift in Iowa, and the Iowan Surface landform region, which was modified by various episodes of erosion before Wisconsinan glacial events (Prior, 1991).

Most of the Northwood quad is covered by Quaternary deposits with a maximum thickness of about 35 m (115 ft), but a few bedrock outcrops were found along the Shell Rock River. Quarries in the southern part of the quad provided significant information for the regional bedrock stratigraphic study. Subsurface information was also derived from the analysis of water well materials collected by Iowa Geological and Water Survey (IGWS) and stored in the GEOSAM database of IGWS. Bedrock information from more than 85 private and public wells within the quad was studied and used for the bedrock geologic mapping.

Middle and lower Upper Devonian rocks form the major bedrock surface and upper bedrock aquifer in the mapping area. This area is within the northern region of the Devonian Iowa Basin. The stratigraphy of this basin has been intensively studied by IGWS staff (e.g., Belanski, 1927, 1928; Koch, 1970) and re-studied and correlated by Witzke and Bunker (1984), Bunker and others (1986), Witzke and others (1988), Anderson and Bunker (1998), Groves and others (2008), etc. The stratigraphic nomenclature and correlation for this map follow the stratigraphic framework proposed by Witzke and others (1988).

The youngest bedrock unit within the quad is the Cretaceous Windrow Formation, which usually occurs as iron-rich reddish erosional outliers a few meters thick in north-central Iowa (Witzke et al., 2010). The Devonian rocks are dominated by carbonates varying between limestone and dolomite, accompanied with minor shale. Based on lithologic features and fossils, the Devonian bedrock in the mapping area can be subdivided into, in descending order, the Shell Rock, Lithograph City, and Coralville formations. The Shell Rock Formation occurs in the southern part of the quad and is characterized by fossiliferous and stromatoporoid-rich carbonates. Shaly carbonates are also common in the middle portion of the Shell Rock Formation. The underlying Lithograph City Formation is usually represented by laminated lithographic and sublithographic limestone and dolomite and is the dominant bedrock unit in the quad. Locally, a meter-thick fossiliferous and stromatoporoid-rich facies occurs near the middle of the Lithograph City Formation. The Coralville Formation is characterized by limestone dolomitic limestone, and dolomite, sometimes argillaceous. It forms the bedrock surface in bedrock valleys along northern border of the quad.

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LEGEND

CENOZOIC

QUATERNARY SYSTEM

Qu – Undifferentiated unconsolidated sediment Consists of loamy soils developed in loess, glacial till, and colluvium of variable thickness, and alluvial clay, silt, sand, and gravel. Total thickness can be up to 35 m (115 ft) in the quad. This unit is shown only on the cross-section, not on the map.

MESOZOIC

CRETACEOUS SYSTEM

Kw – Sandstone, Mudstone, and Siderite Pellets (Windrow Formation) "Mid"-Cretaceous. This map unit occurs as erosional outliers and is only found occasionally in well materials in the mapping area. The formation is characterized by reddish shaly sandstone and mudstone or siderite pellets. Its thickness is variable, but usually less than 6 m (20 ft).

PALEOZOIC

DEVONIAN SYSTEM

Dsr - Limestone, Dolomite, and Shale (Shell Rock Formation) Upper Devonian. This map unit usually has a thickness of 12 to 18 m (40-60 ft) and occurs in the southern part of the quad. The unit is characterized by fossiliferous carbonates with some grey to light green shale. Layers containing abundant subspherical and tabular stromatoporoids commonly occur in the lower part of the unit. Brachiopods, bryozoans, corals, and crinoids are abundant in some intervals.

Dlgc - Dolomite, Limestone, and Shale (Lithograph City Formation) Middle to Upper Devonian. This map unit forms the major uppermost bedrock in the quad, with a maximum thickness of up to 33 m (110 ft). This unit consists of dolomite and dolomitic limestone, partially characterized by interbeds of laminated lithographic and sublithographic limestone and dolomitic limestone, in part argillaceous or with little shale. "Birdseye" structures are common. Some intervals are fossiliferous and stromatoporoid-rich.

Dcv - Limestone and Dolomite (Coralville Formation) Middle Devonian. The thickness of this map unit varies between 10 and 18 m (35-60 ft) and it is dominated by limestone, dolomitic limestone, and dolomite, in part laminated and argillaceous. Brachiopods and corals usually occur in the limestone facies.

Dlc - Dolomite and Limestone (Little Cedar Formation) Middle Devonian. The thickness of this map unit ranges from 27 to 35 m (90-115 ft) in the study area. The unit is dominated by slightly argillaceous to argillaceous dolomite and dolomitic limestone, usually vuggy and partially laminated and/or cherty. This unit is commonly fossiliferous, and brachiopods are especially abundant in the lower portion. This unit is shown only on the cross-section, not on the map.

Drill Holes

Outcrops

Correlation of Map Units